

8 Reasons to Use an RTOS

When it comes to task scheduling in embedded systems, simple super loops may suffice for smaller, less complex designs. However, as your system scales and becomes more intricate, switching to an RTOS can offer substantial advantages. An RTOS not only streamlines task management but also enhances system performance, scalability, and overall efficiency, making it a critical consideration for advanced software designs.

1. Hard Real Time Responsiveness

A priority based, pre-emptive RTOS permits the prioritisation of tasks according to their real time requirements. Tasks that have strict timing constraints are able to take precedence over those that have greater scheduling flexibility, improving the application's responsiveness to time critical events.

2. Maximize System Performance

For many larger, complex embedded applications, using an event driven RTOS (especially a micro kernel) instead of a polled super loop architecture can produce a more effective design, resulting in a smaller memory footprint and making more processor time available to the application.

3. Reduces Complexity

An RTOS allows the application to be broken down into a set of smaller, autonomous tasks. Each task executes within its own context, with no dependency on other tasks within the system or the scheduler itself. This results in a set of small, easy to understand tasks, scheduled by the RTOS.

4. Peak Load Management

An RTOS provides an effective method of managing systems with high peaks of activity. Higher priority levels are allocated to the tasks performing the peak load activities, ensuring they obtain access to the processor at critical times, whilst lower priority tasks are delayed during this time.

5. Scalability and Adaptability

An RTOS offers exceptional scalability and adaptability, allowing systems to grow and evolve with changing requirements. Whether scaling up to handle increased workloads or integrating new functionalities, the RTOS' flexible task management ensures continued efficiency and responsiveness.

6. Larger Development Teams

The modular design of an RTOS allows for clear task definitions, making it easier to delegate work across larger development teams. Each task can be handled as a separate project, facilitating efficient collaboration and integration.

7. Easier Debug and Verification

As the system is split into a set of individual tasks with well-defined functionality and no dependencies on other tasks, it makes it easier to debug and verify each task before integration with the remaining system.

8. Code Re-use

The modular design used within an RTOS system encourages software functionality to be created as independent and verified tasks. As there are no dependencies on other tasks, the re-use of these modules within other designs is made simple.

8 Reasons to Use an RTOS From WITTENSTEIN

WITTENSTEIN high integrity systems (WHIS) are experts in embedded RTOS and Middleware technology with a specialization in safety certified software. Supplying advanced RTOS and Middleware components across a broad range of market sectors and applications, from basic embedded designs, up to complex safety systems demanding the highest levels of certification.

1. A Global Safety Company

WHIS is first and foremost a safety systems company with a history in aerospace. Our expertise is exemplified by SAFERTOS®, which is globally trusted and proven across a wide range of critical applications, from Safety Island, Autonomous Systems and Battery Management Systems, in industries such as automotive, industrial, medical and aerospace.

2. Comprehensive Product Range

The WHIS RTOS ecosystem consists of:

- OPENRTOS®: A commercial license for FreeRTOS.
- SAFERTOS®: A safety critical RTOS pre-certified to ISO 26262 and IEC 61508. Compliant to IEC 62304 and DO 178C.

3. Partner Ecosystem

With FreeRTOS and SAFERTOS® sharing the same functional model, upgrading is seamless and reduces training costs for teams already using FreeRTOS. FreeRTOS, downloaded every 170 seconds in 2024, powers a massive global user base. SAFERTOS®, backed by strategic partnerships with silicon vendors and a range of supported platforms, offers unparalleled support for your next project.

4. Tool Support

SAFERTOS® is supported by a wide range of industry tool suppliers, including PLS Universal Debug Engine, Lauterbach TRACE32®, VectorCAST, Stateviewer, and Tracealyzer, ensuring efficient debugging, testing, and system optimization.

5. Quality

Built on robust quality systems and rigorously tested across diverse sectors, SAFERTOS® is a proven and exceptionally resilient solution for safety-critical applications. Supported by our Design Assurance Pack (DAP), SAFERTOS® delivers unmatched reliability and performance, ensuring it meets the highest standards in safety-critical environments.

6. Training, Consultancy and Support

Our additional services are crafted to support our customers by leveraging our expertise to enhance your final design, streamline your design processes, and facilitate a smoother path to certification. Additionally, WHIS can provide bespoke, in-depth training courses. For example, assisting with OS porting to your hardware (DCR) and providing continuous support throughout your project, including IDE updates.

7. Flexible Licensing

We aim to provide customers with the license model that best suits their needs, supported by a transparent pricing policy. Our standard licensing model uses a royalty free, perpetual license.

8. Part of an International Corporation

WITTENSTEIN high integrity systems is part of the WITTENSTEIN group, a global technology company established in 1949. With a presence in over 45 countries and a workforce exceeding 2,800 employees, WITTENSTEIN achieved a turnover of over 500 million USD in the 2022/23 fiscal year.

WITTENSTEIN high integrity systems

Worldwide Sales and Support
Americas: +1 408 625 4712
ROTW: +44 1275 395 600
Email: sales@highintegritysystems.com
Web: www.highintegritysystems.com



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